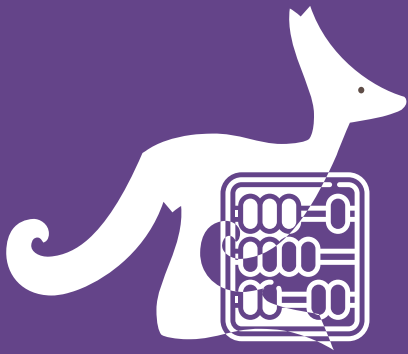




MATH KANGAROO CHINA

考试说明 / Instruction

Time allowed: 75 minutes

考试时长: 75 分钟

Language: English & Chinese

试卷语言: 英文和中文

This is a 30-question multiple-choice competition.

考试包含 30 道单项选择题。

Problems 1 to 10 are worth 3 points each.

1-10 题每题 3 分

Problems 11 to 20 are worth 4 points each.

11-20 题每题 4 分

Problems 21 to 30 are worth 5 points each.

21-30 题每题 5 分

1 point will be deducted for an incorrect answer and
no point for a blank answer.

答错扣 1 分, 不答不扣分。

The full score is 150 (Starting point is 30)

总分为 150 分 (起始分数为 30 分)

Do not open this booklet until you are told to do so.

收到监考老师指令后, 方可打开试卷册。

Mark your answers clearly on the answer sheet using a **2B pencil**.

务必使用 **2B 铅笔** 在答题卡上正确填涂自己的答案。

Calculator cannot be used during the competition.

考试期间禁止使用计算器。

DO NOT discuss problems and solutions in any online or public
forum until April 30.

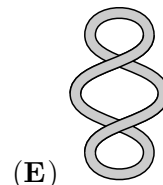
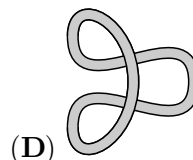
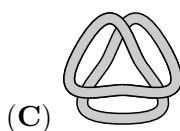
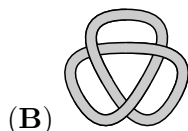
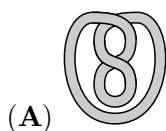
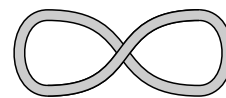
4 月 30 日前请勿以任何形式公开讨论试题和答案。

**Grade 7
&
Grade 8**

3 points

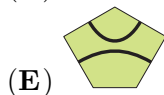
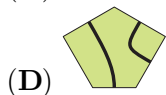
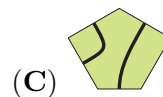
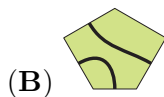
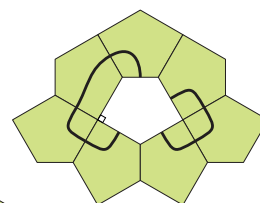
1. Which of the following strings cannot be transformed into the string on the right without cutting?

请问下列哪条绳子在不切割的情况下，无法变成右图所示的样式？



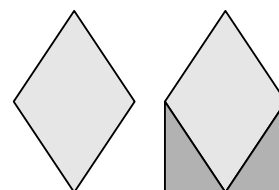
2. A shape is made of equal-sized pentagonal tiles. Which of the following tiles can be placed in the space in the shape to produce two closed curves?

右侧图形由尺寸相同的五边形瓷砖组成。请问将下列哪块瓷砖放入这个图形的空白处可以形成两条封闭曲线？



3. The first diagram shows a rhombus. The area of the first diagram is increased by adding two right-angled triangles, as shown. By what percentage has the area increased?

如图所示，第一个图形为菱形，加上两个直角三角形之后，图形面积有所增加。请问面积增加了百分之几？



- (A) 20% (B) 25% (C) 30% (D) 40% (E) 50%

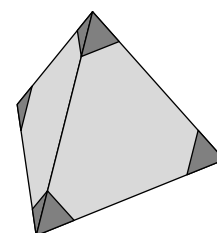
4. What is the value of $\frac{20 \times 24}{2 \times 0 + 2 \times 4}$?

请问 $\frac{20 \times 24}{2 \times 0 + 2 \times 4}$ 的值是多少？

- (A) 12 (B) 30 (C) 48 (D) 60 (E) 120

5. Julio cuts off the four corners of a regular tetrahedron, as shown. How many corners does the shape that remains have?

如图所示，Julio 切掉了一个正四面体的四个角。请问余下图形有多少个角？



- (A) 8 (B) 9 (C) 11
(D) 12 (E) 15

6. Ria has three counters marked 1, 5 and 11, as shown. She wants to place them side by side to make a four-digit number. How many different four-digit numbers can she make?



Ria 有三个筹码，分别标记有 1、5 和 11，如图所示。将三个筹码并排放置组成一个 4 位数，请问 Ria 可以得到多少个不同的 4 位数？

- (A) 3 (B) 4 (C) 6 (D) 8 (E) 9

7. A fruit bowl contains five types of fruit: , , , and . Al likes . Bok likes , , and . Cam likes , , and . Don likes , and . Eva likes and . The fruit is shared so that everyone gets a different type of fruit and everyone gets a type of fruit that they like. Who gets ?

一个果篮里有 5 种水果: 、 、 、 、 。 Al 喜欢 ; Bok 喜欢 、 、 、 ; Cam 喜欢 、 、 、 ; Don 喜欢 、 、 ; Eva 喜欢 、 。大家分享这些水果时，每个人拿到的水果都不同且都是自己喜欢的水果。请问谁拿到了 ?

- (A) Al (B) Bok (C) Cam (D) Don (E) Eva

8. The weight restriction notice for an elevator says it can carry either 12 adults or 20 children. According to the weight restrictions, what is the largest number of children that can ride in the elevator with nine adults?

电梯超载提示标明，该电梯能承载 12 名成年人或 20 名儿童。根据该提示，如果该电梯已经搭载了 9 名成年人，那么最多还能搭载多少名儿童？

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 8

9. Four different positive integers are placed on a grid and then covered up. The products of the integers in each row and in each column are shown in the diagram. What is the sum of the four integers?

		6
		8
4	12	

在一个网格中放入 4 个不同的正整数，然后将其遮盖。右图中显示的数字分别为每行和每列中的整数之积。请问这 4 个整数的总和是多少？

- (A) 10 (B) 12 (C) 13
(D) 14 (E) 15

10. The length of a set of four well-parked and fitted supermarket trolleys is 108 cm. The length of a set of ten well-parked and fitted supermarket trolleys is 168 cm. What is the length of a single supermarket trolley?

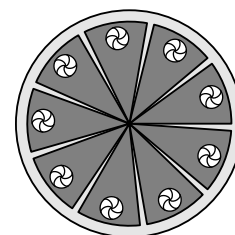


一排 4 辆整齐停放的超市手推车的长度为 108 cm。一排 10 辆整齐停放的超市手推车的长度是 168 cm。请问一辆超市手推车的长度是多少？

- (A) 60 cm (B) 68 cm (C) 78 cm (D) 88 cm (E) 90 cm

4 points

11. Carina baked a cake and cut it into ten equal pieces. She ate one piece and then arranged the remaining pieces evenly, as shown. What is the size of the angle between any two pieces?



Carina 将自己烤的蛋糕等分为 10 块。她吃了一块，然后将剩下的 9 块均匀分布，如图所示。请问任意两块相邻的蛋糕之间的角度是多少？

- (A) 5° (B) 4° (C) 3° (D) 2° (E) 1°

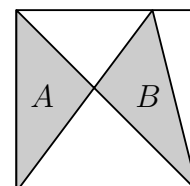
12. Werner can make a 4×4 square, where the sum of the numbers in all four rows and all four

columns is the same, from the three pieces shown and one further piece. Which of the following pieces is needed to complete his square?

Werner 做了一个 4×4 的正方形，这个正方形中每行、每列的 4 个数字之和相同。正方形可分成四块碎片，其中三块碎片为：。请问下列哪个选项是该正方形的最后一块碎片？

- (A) (B) (C) (D) (E)

13. A square has side-length 10 m. It is divided into parts by three straight line segments, as shown. The areas of the two shaded triangles are A and B . What is the value of $A - B$?



如图所示，一个边长为 10 m 的正方形被三条线段切分。其中两个阴影三角形的面积分别为 A 和 B 。请问 $A - B$ 的值为多少？

- (A) 0 m^2 (B) 1 m^2 (C) 2 m^2 (D) 5 m^2 (E) 10 m^2

14. Paula the penguin goes fishing every day and always brings back twelve fish for her two chicks. Each day, she gives the first chick she sees seven fish and gives the second chick five fish, which they eat. In the last few days one chick has eaten 44 fish.

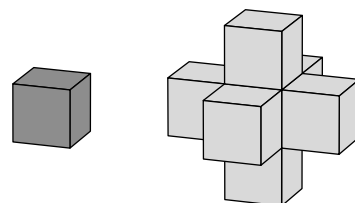
How many has the other chick eaten?

企鹅 Paula 每天都出门捕鱼，并且总是会给她的两只企鹅幼崽带回 12 条鱼。每一天，Paula 会给她看到的第一只企鹅幼崽喂 7 条鱼，给看到的第二只企鹅幼崽喂 5 条鱼。在过去的几天中，其中一只企鹅幼崽一共吃掉 44 条鱼。

请问另一只企鹅幼崽一共吃了多少条鱼？

- (A) 34 (B) 40 (C) 46 (D) 52 (E) 58

15. Johan had a large number of identical cubes. He made the structure on the right by taking a single cube and then sticking another cube to each face. He wants to make an extended structure in the same way so that each face of his original structure will have a cube stuck to it.



How many extra cubes will he need to complete his extended structure?

Johan 有许多相同的立方体。他选取其中一个立方体，然后将其他立方体贴在该立方体的各个面上，最终形成右侧所示结构。接下来，他想用同样的方式制作一个扩展结构，使得原结构的每一面上都贴上一个立方体。请问 Johan 还需要多少个立方体才能完成这个扩展结构？

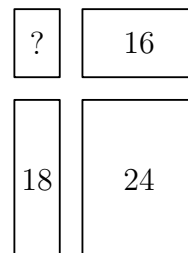
- (A) 18 (B) 16 (C) 14 (D) 12 (E) 10

16. A kangaroo jumps up a mountain and then jumps back down along the same route. It covers three times the distance with each downhill jump as it does with each uphill jump. Going uphill, it covers 1 metre per jump. In total, the kangaroo makes 2024 jumps. What is the total distance, in metres, that the kangaroo jumps?

一只袋鼠跳上山，然后按照同样的路线跳下山。它下山时每次跳跃的距离是上山时每次跳跃距离的三倍。袋鼠上山时每次跳跃的距离是 1 米。袋鼠上下山总共跳了 2024 次，请问袋鼠总共跳跃了多少米？

- (A) 506 (B) 1012 (C) 2024 (D) 3036 (E) 4048

17. Gerard cuts a large rectangle into four smaller rectangles. The perimeters of three of these smaller rectangles are 16, 18 and 24, as shown in the diagram. What is the perimeter of the fourth small rectangle?



Gerard 将一个大矩形切割成 4 个小矩形。其中三个小矩形的周长分别为 16、18、24，如图所示。请问第四个小矩形的周长是多少？

- (A) 8 (B) 10 (C) 12
(D) 14 (E) 16

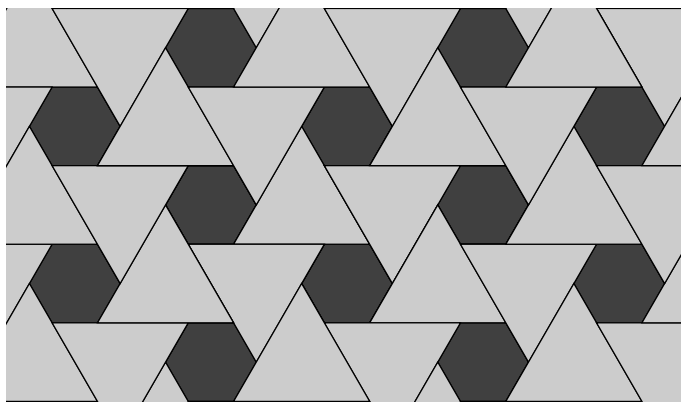
18. Water makes up 80 percent of the mass of fresh mushrooms. However, water makes up only 20 percent of the mass of dried mushrooms. By what percentage does the mass of the mushroom decrease during drying?

新鲜蘑菇中的水分占总质量的 80 %，但干蘑菇中的水分只占总质量的 20%。请问在晒干过程中，蘑菇的质量减少了百分之几？

- (A) 60 (B) 70 (C) 75 (D) 80 (E) 85

19. Teri the tiler is planning to make a large, square mosaic floor with a repeating pattern, using hexagonal and triangular tiles, arranged as shown in the diagram.

泥瓦匠 Teri 计划按照一定的规律将六边形瓷砖和三角形瓷砖拼接成一个大块正方形马赛克地板，排列方式如图所示。



She thinks she will use 3000 hexagonal tiles to make the whole floor. Approximately, how many triangular tiles will she need?

Teri 认为铺成这样一整块地板需要用 3000 块六边形瓷砖。请问 Teri 大约需要用多少块三角形瓷砖？

- (A) 1000 (B) 1500 (C) 3000 (D) 6000 (E) 9000

20. Nine cards numbered from 1 to 9 were placed facedown on the table. Aleksa, Bart, Clara and Deindra each picked up two of the cards. Aleksa said “My numbers add up to 6” . Bart said “The difference between my numbers is 5” . Clara said “The product of my numbers is 18” . Deindra said “One of my numbers is twice the other one” . All four made a true statement. Which number was left on the table?

九张编号为 1 到 9 的卡牌正面朝下放在桌子上。Aleksa, Bart, Clara 和 Deindra 每个人都从桌子上挑选 2 张牌。Aleksa 说：“我拿到的卡牌上的数字相加等于 6。” Bart 说：“我拿到的卡牌上的数字之差是 5。” Clara 说：“我拿到的卡牌上的数字的乘积为 18。” Deindra 说：“我拿到的卡牌上的其中一个数字是另一个数字的两倍。” 如果他们 4 个人说的都是真的，那么请问桌子上剩余卡牌上的数字是什么？

- (A) 1 (B) 3 (C) 6 (D) 8 (E) 9

5 points

21. The digits 0 - 9 can be drawn with horizontal and vertical segments, as shown. Greg chooses three different digits. In total, his digits have 5 horizontal segments and 10 vertical segments. What is the sum of his three digits?

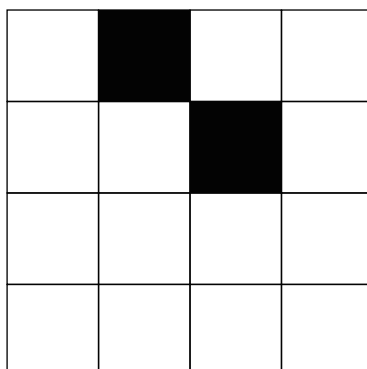
用横线和竖线表示数字 0 - 9，如图所示。Greg 从中选取三个不同数字。他选取的数字一共包含 5 条横线和 10 条竖线。请问他选取的三个数字之和是多少？



- (A) 9 (B) 10 (C) 14 (D) 18 (E) 19

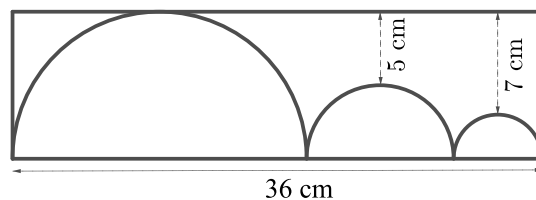
22. Tarek wants to shade two further squares on the diagram shown so that the resulting pattern has a single axis of symmetry. In how many different ways can he complete his pattern?

Tarek 想将下图中的另外两个方格涂黑，使得最终所得图形只有一条对称轴。请问他能用几种不同的涂法来完成他想要的图形？



- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

23. The diagram shows three semi-circles inside a rectangle. The middle semi-circle touches the other two semi-circles which, in turn, each touch a shorter side of the rectangle. The largest semi-circle also touches one of the longer sides of the rectangle. The shortest distances from that side of the rectangle to the other two semi-circles are 5 cm and 7 cm respectively, as shown. What is the perimeter, in cm, of the rectangle?



图中展示了一个矩形中有三个半圆。中间的半圆与两侧的半圆相切，两侧的半圆分别与矩形的一条短边相切，同时，最大的半圆与矩形的一条长边相切，且这条长边到另外两个半圆的最短距离分别为 5 cm 和 7 cm，如图所示。请问这个矩形的周长为多少 cm？

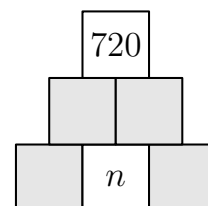
- (A) 82 (B) 92 (C) 96 (D) 108 (E) 120

24. A group of 50 students sit in a circle. They throw a ball around the circle. Each student who gets the ball throws it to the 6th student sitting anti-clockwise from where they are sitting, who catches it. Freda catches the ball 100 times. In that time, how many students never get to catch the ball?

50 名学生坐成一圈，然后绕着这个圆圈传球。每名拿到球的学生会把球传给从自己所在位置起逆时针方向上的第 6 名学生。Freda 共接到 100 次球。在这段时间里，有多少名学生从来没有接到过球？

- (A) 0 (B) 8 (C) 10 (D) 25 (E) 40

25. Donggyu wants to complete the diagram so that each box in the middle and top rows will contain the product of the values in the two boxes below it and each box contains a positive integer. He wants the value in the top box to be 720. How many different values can the integer n take?



Donggyu 想完成右图，使得中间行和顶行中的每个方格都包含其下方紧邻的两个方格内的数字之积，且每个方格内均为正整数。他希望顶行方格中的数字为 720，那么请问整数 n 可以有多少个不同的数值？

- (A) 1 (B) 4 (C) 5 (D) 6 (E) 8

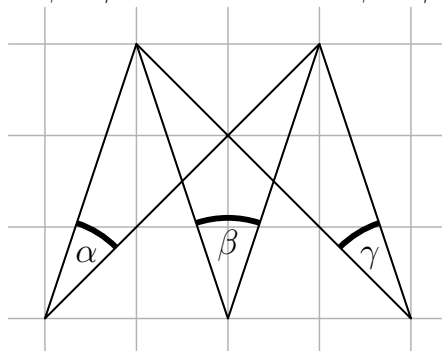
26. Farmer Fi is selling chicken and duck eggs. She has baskets holding 4, 6, 12, 13, 22, and 29 eggs. Her first customer buys all the eggs in one basket. Fi notices that the number of chicken eggs she has left is twice the number of duck eggs. How many eggs did the customer buy?

农夫 Fi 正在卖鸡蛋和鸭蛋。她有很多个篮子，里面分别装有 4、6、12、13、22、29 个蛋。第一位顾客买了其中一个篮子中所有的蛋。此时 Fi 注意到在剩下的蛋中，鸡蛋数量是鸭蛋数量的两倍。请问这位顾客买了多少个蛋？

- (A) 4 (B) 12 (C) 13 (D) 22 (E) 29

27. Three angles α , β and γ are marked on squared paper, as shown. What is the value of $\alpha + \beta + \gamma$?

如图所示，方格纸上标记有 α 、 β 、 γ 三个角。请问 $\alpha + \beta + \gamma$ 的值是多少？



- (A) 60° (B) 70° (C) 75° (D) 90° (E) 120°

28. Captain Flint asked four of his pirates to write on a piece of paper how many gold, silver and bronze coins were in the treasure chest. Their responses are shown in the diagram but unfortunately part of the paper was damaged. Only one of the four pirates told the truth. The other three lied in all their answers. The total number of coins is 30. Who told the truth?

海盗船长 Flint 要求他的 4 位船员在一张纸上记录下藏宝箱中金币、银币、铜币的数量。船员们的记录如下图所示，但不幸的是，纸张出现了部分破损。四位船员中只有一位是如实记录，其他三位记录的数字全部都是虚假的。已知硬币的总数量为 30 枚。请问哪位船员记录的数字是真实的？

	金币 Gold	银币 Silver	铜币 Bronze
Tom		9	11
Al	7		12
Pit	10		10
Jim	9	10	

- (A) Tom (B) Al (C) Pit
(D) Jim (E) we cannot be sure 无法确定

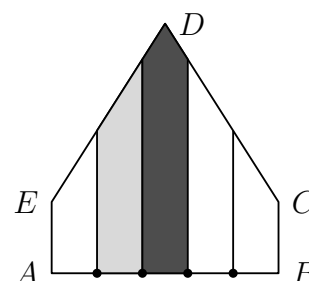
29. Alex drives from point A to point B , then immediately returns to A . Bob drives from point B to point A , then immediately returns to B . They travel on the same road, start at the same time and each travels at a constant speed. Alex's speed is three times Bob's speed. They pass each other for the first time 15 minutes after the start. How long after the start will they pass each other for the second time?

Alex 开车从 A 点到 B 点，然后又立刻返回 A 点。Bob 开车从 B 点到 A 点，然后又立刻返回 B 点。他们在同一条路上行驶，同一时间出发，并且匀速前行。Alex 的速度是 Bob 的三倍。他们出发 15 min 后第一次相遇。请问他们在出发多久之后会第二次相遇？

- (A) 20 min (B) 25 min (C) 30 min (D) 35 min (E) 45 min

30. In the pentagon $ABCDE$, $\angle A = \angle B = 90^\circ$, $AE = BC$ and $ED = DC$. Four points are marked on AB dividing it into five equal parts. Then perpendiculars are drawn through these points, as shown in the diagram. The dark shaded region has an area of 13 cm^2 and the light shaded region has an area of 10 cm^2 . What is the area, in cm^2 , of the entire pentagon?

在五边形 $ABCDE$ 中, $\angle A = \angle B = 90^\circ$, $AE = BC$, $ED = DC$ 。在线段 AB 上标出 4 个点, 将其分成 5 等份。然后经过这 4 点做垂线, 如图所示。深色阴影区的面积为 13 cm^2 , 浅色阴影区的面积为 10 cm^2 。请问整个五边形的面积为多少 cm^2 ?



- (A) 45 (B) 47 (C) 49 (D) 58 (E) 60